Forest Insect Laboratory
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FOREST INSECT SURVEYS - LASSEN NATIONAL FOREST
Season of 1937

APPROVED BY:

Senior Entomologist, in Charge.

SUBMITTED BY:

Entomologist

Junior Entomologist.

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K. A. Salman and J. W. Bongberg

During the past eight years, insect-caused losses in the eastern Lassen area have been heavy and of unusual concern to those interested in actual or potential forest production, logging, sustained yield, timber management plans and experimental management programs. The record of loss that has been kept by the Bureau of Entomology and Plant Quarantine since 1930 gives some idea as to how much the drain from entomological causes affects other forestry activities. This record is made up of a series of annual reports on current infestation conditions of which this is the seventh in the series. In those reports the amount of loss is estimated from accurately measured samples, infestation trends are analyzed and in this report a forecast of the immediate future of the infestation is attempted. The hazard inventory project is securing a basis from which it is hoped we can make longer term forecast and an estimate of potential hazard.

ORGANIZATION OF AREA

New units and unit boundaries have been set up during 1937 as a result of field work on the hazard inventory project. This new organization of the area provides for more homogeneous units in which the environment, the stand, and the hazard from loss is less varied than in the former separation of the area into units. As before, some management and logging requirements have been considered in determining the new unit boundaries. However, those requirements have not been the primary factors to be considered. The new organization of the area into units is shown in the appended map. It is expected that additional plots will be established during the coming season to provide for a better sampling of the area and for a better basis for future estimates of loss.

CURRENT INFESTATION CONDITIONS

Estimates of losses on the several units of the eastern Lassen area are given in Table I. Plot losses, which are listed in Table II show that the peak of the last cycle of epidemic infestations occurred in 1934. There has been a significant and general decrease in losses since that time. However, as the stand is mixed Jeffrey and ponderosa pine and the trends of infestation in the two species of trees are different, the recent increases in Jeffrey pine losses have partially offset the great decreases that have occurred in the ponderosa pine losses.

The peak loss of 1934 was estimated to be 95 million board feet. The 1937 estimate is about 18 million board feet. This drop, over a period of four years, illustrates the wide variation in infestations that may occur within a relatively short time.

The 1937 infestation was light (56 b.m. per acre - plot average) but even though conditions appear to be relatively stable, they potentially are hazardous in many parts of the area. Although current losses are low, there is a nucleus of insects and an abundance of sufficiently weakened host material. It will require but a few mildly favorable factors to initiate another cycle of epidemic infestations.

In ponderosa pine the western pine beetle played a secondary role during the 1937 season, chiefly because of natural trends and because of an additional population reduction brought about by the low temperatures of January, 1937. Flatheaded borers were concerned in causing about 64 percent of the loss in average areas. Flatheaded borers also were an important cause of loss in Jeffrey pine. However, it was noted that a considerable increase in the activity and importance of the jeffrey pine beetle also showed up during the season.

FORECAST FOR 1938

In the Modoc Forest a continuous six year record of infestation factors believed to be important as indices of subsequent infestation developments enabled us to offer a forecast for 1938 with reasonable expectation that it would, in general, be correct. Forecasting the 1938 conditions for the Lassen area cannot be attended with the same expectation of accuracy as much more varied conditions exist. The presence of Jeffrey pine in the stands and the lack of a long record of index factors injects complications in diagnosing the pine infestation trends.

In May, 1937, utilizing a few analyses of infested trees and the indications of the Modoc sample, we made the following forecast:- "Similar to the Modoc except that the reduction will be less. In Jeffrey pine the infestation will continue at a somewhat increased rate. Loss in ponderosa pine will predominantly be loss of stag-topped, top-killed or top-infested trees in which progressive attacks have preceded the complete infestation." That forecast proved to be substantially correct, although it was incorrect in that the 1937 estimates for the Lassen area showed more of a reduction than occurred in the Modoc area. The correctness of the estimate has been brought out by an analysis of a sample of infested trees containing fall and overwintering 1937 broods. Those analyses provide the basis for the 1938 forecast of infestation conditions which follows:-

Infestation to remain fairly stable during 1938 with some increases possible in fringe stands and areas of high hazard. However, it is not expected that the volume of timber killed will show much of an increase. A marked selection will be continued during the season, with weakened,

previously top-killed or partially infested trees predominating in the loss. Infestations probably light and losses low on better sites. Broods of western pine beetle to be strengthened during the season in trees carrying mixed infestations. However, little loss will result from attacks initiated by the western pine beetle. The jeffrey pine beetle activity will continue to increase.

RECOMMENDATIONS

In general, current infestation conditions in pine are not alarming. For that reason no direct control recommendations are made.

However, present stand conditions and the potential hazard from future losses in those stands still present an obstacle of considerable proportions to successful management and utilization programs. One can but state that, given the right conditions, infestations of epidemic proportions and character can develop in a very short period of time. The large amount of highly susceptible host material remaining in the stands is and probably will remain for some time as an important factor that must be considered seriously in protection plans. It is felt that that type of hazard factor requires the placing of the entire area in as good a condition of resistance and management as is compatable with reasonable economic or administrative procedure. That is our recommendation.

The objective to be reached in providing for adequate protection from insect-caused depredations is one requiring coordinated plans and action by several groups. Although direct control methods and salvage logging of infested trees may have a place in those plans as emergency methods to meet sertain threats, chief reliance must be placed on more permanent indirect or cultural methods. No such methods have been tested and proven. No tested plans for their application exists. Such methods now are the subject of considerable experimentation the results of which will not be available for some time to come.

In spite of the lack of definite plans and methods of procedure it is entirely possible, if not probable that cultural methods will be needed before they have been thoroughly tested and proven satisfactory. In that event it seems reasonable to recommend that private operators, and public timber administering agencies join in going as far in applying indirect methods of control as the indications of experimental results, the application of logic and the limitations of economic factors will premit.

LOSSES IN OTHER SPECIES

For some years infestations in white fir have been known to cause considerable damage. However, we previously have not attempted to measure the volume that has been killed. In 1937 losses in other species were cruised and it is intended that that practice will be continued in future surveys.

Losses in other tree species occurred on five of the cruise plots. The 1937 record is as follows:-

1937 PLOT LOSSES - SPECIES OTHER THAN PINE
Per section basis.

Plot	White Fir		Incense Cedar	
	No. trees	Volume b.m.	No. trees	Volume b.m.
L-5	32	44,340		
L-8	8	7,360		
L-9	6	2,740		
L-10	2	460	2	920
L-14	92	48,580	6	4,620

TABLE I

PINE LOSSES ON SURVEY PLOTS - VIRGIN STANDS, LASSEN NATIONAL FOREST

Per Section Basis.

Plot No.	1935 Cruise				1936 Cruise				1937 Estimate			
	Trees	Vol.BM	BM/ac	% 1934	Trees	Vol.B.M.	BM/ac	% 1935	Trees	Vol.B.M.	BM/ac	% 1936
L-1	200	201,400	314	119	60	70,540	110	35	58	43,900	69	63
L-3	154	153,680	240	61	70	73,080	114	48	28	43,780	68	60
L-5	158	112,280	175	104	72	87,200	136	78	36	44,200	69	51
L-6	72	35,800	56	47	72	41,100	64	115	20	28,860	45	70
L-7	134	82,340	129	97	18	11,900	18	15	16	23,040	36	200
L-8	378	306,120	478	82	130	112,720	176	37	38	26,380	41	23
L-9	206	145,440	227	55	86	89,360	140	61	38	29,260	46	32
L-10	180	95,600	149	64	104	59,080	92	62	30	26,100	41	45
L-11	108	88,820	139	38	56	111,860	175	126	38	65,800	103	59
L-12	30	48,400	76	48	26	53,500	84	111	14	21,340	33	39
L-13	116	66,460	104	77	60	74,320	116	112	36	39,780	62	53
L-14	298	247,480	387	52	108	99,300	155	40	20	38,000	59	38
Aver.	170	131,990	206	67	72	72,000	113	55	31	35,880	56	49

Records discontinued:

Plot L-2 - Losses measured as compartment on Experimental Forest.

Plot L-4 - Cutover. Continued as CO-25.

Plot L-15 - Cutover 1936. Discontinued.

TABLE II

UNIT LOSSES - LASSEN NATIONAL FOREST

Unit	Virgin timbered acreage	1934		1935		1936		1937	
		No. of trees	Volume M.B.M.	No. of trees	Volume M.B.M.	No. of trees	Volume M.B.M.	No. of trees	Volume M.B.M.
Bogard Buttes	25,200	4,740	5,390	3,700	2,800	2,270	3,530	1,580	2,070
Stephens Ranch	27,760	2,850	2,800	4,100	2,910	1,880	2,280	9,280	1,140
Butte Creek	27,260	2,570	5,180	1,540	2,480	1,340	2,750	7,1[illegible]	1,090
Hall's Flat	11,320	1,370	1,510	1,770	1,780	530	620	520	390
Nigger Spring	14,830	4,010	2,360	2,150	1,070	2,150	1,230	600	860
Beaver Creek	28,380	17,340	18,730	1,100	8,370	4,480	4,630	640	2,040
Black's Mtn.	30,250	8,750	9,620	11,320	11,400	3,390	3,990	3,320	2,510
Crater Mtn.	14,100	1,660	1,632	2.390	1,694	1,270	1,540	640	780
Harvey Valley	22,130	9,640	8,850	6,230	5,180	2,700	2,810	1,140	1,260
Straylor Lake	28,660	15,180	17,080	13,580	11,120	6,430	5,730	1,550	1,720
Gordon Valley	34,320	11,900	12,390	13,700	10,400	4,300	3,330	1,460	1,440
Cave Mtn.	17,460	5,820	3,890	5,110	2,900	1,980	1,150	760	870
Logan Mtn.	2,060	590	440	480	310	200	180	90	90
Coble Mtn.	21,510	4,990	3,610	4,120	2,240	2,880	2,520	1,410	1,510
Brockman Flat	10,590	3,920	2,470	3,030	1,580	1,710	970	490	430
Total	315,830	95,330	95,952	74,320	66,234	37,510	37,260	15,840 30,630	18,200

Units without Estimates

Campbell Butte	10,880
Merrell Flat	25,060
Dixie Valley	17,450

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

REGIONAL SURVEYS

EASTERN LASSEN AREA, CALIFORNIA

UNIT BOUNDARY
SAMPLE PLOT; VIRGIN STAND
SAMPLE PLOT; CUTOVER STAND
CUTOVER LAND

J.W. FISKE

W. R.1E. R2E R3E R4E. R.5E R.6E. R7E R.8E. R.9E R.10E.

T35N. T.34N. T.33N. T.32N. T.31N. T.30N. T.29N. T.28N.

COBLE MT. BEAVER CREEK NIGGER SPRING DIXIE VALLEY STRAYLOR LAKE GORDON VALLEY HALLS FLAT BUTTE CREEK BLACKS MT. HARVEY VALLEY CAVE MT. BROCKMAN FLAT CRATER MT. LOGAN MT. BOGARD BUTTES STEPHENS RANCH CAMPBELL BUTTE MERRILL FLAT LASSEN VOLCANIC NAT. PARK PRIMITIVE AREA GAME REFUGE NO I G

L-1 L-2 L-3 L-5 L-6 L-7 L-9 L-10 L-11 L-12 L-13 L-14 CO-7 CO-8 CO-9 CO-10 CO-25

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APPENDIX - BASIS OF ESTIMATES

1937 Plot Losses

Plot No.	Correction Factor or % cruised
L-1	73
L-2	to be cruised spring 1938
L-3	77
L-4	Cutover - now CO-25
L-5	73
L-6	72
L-7	85
L-8	75
L-9	75
L-10	75
L-11	73
L-12	72
L-13	73
L-14	73
L-15	Discontinued - 1938 (Cut in 1937)

Unit Losses

	1934	1935	1936	1937
Bogard Buttes	L 11+5 ÷ 2x.8	Same	Same	Same
Stephens Ranch	L 5x.6	"	"	"
Butte Creek	L 12 x 1.2	"	"	"
Hall's Flat	L 1 x .5	"	"	"
Nigger Spring	L 6 x 1.3	"	"	"
Beaver Creek	L 13+14 ÷ 2 x 1.2	"	"	"
Black's Mtn.	L 1 x 1.2	"	"	"
Crater Mtn.	L 5 x 1	"	L 5 x.8	"
Harvey Valley	L 3+9 ÷ 2	"	Same	"
Straylor Lake	L 14+8 ÷ 2 x 1.2	"	"	"
Gordon Valley	L 8+7 ÷ 2	"	"	"
Cave Mtn.	L 7+10 ÷ 2 x 1.3	"	"	"
Logan Mtn.	L 5+7+9+10 ÷ 4	"	"	"
Coble Mtn.	L 6+13 ÷ 2 x 1.3	"	"	"
Brockman Flat	L 10 x 1.2	"	"	"